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X.—No. 5

May, 1937

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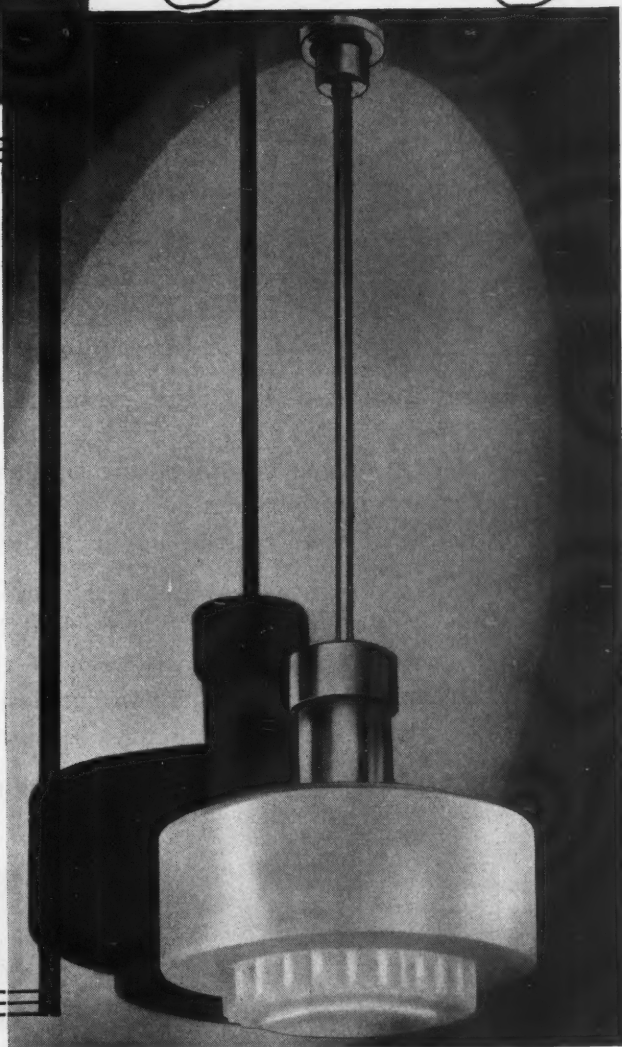
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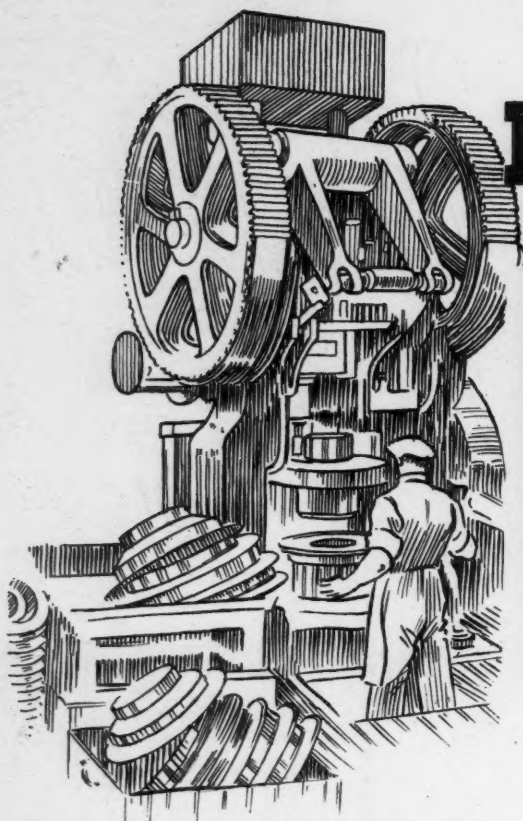
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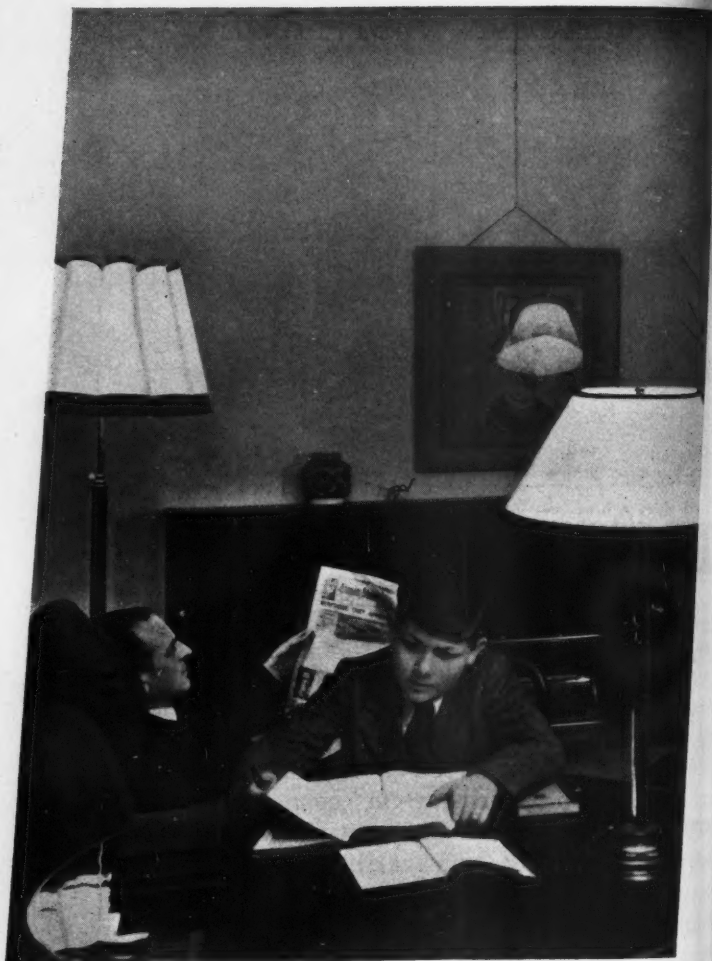
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Light and Lighting

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of the
Illuminating
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A National Electrical Exhibition in 1938?

PLANS for a National Electrical Exhibition, to be held at the new Earl's Court in November, 1938, were discussed at the Luncheon and Conference at the Savoy Hotel, on April 20th. The fact that we are living in a period of "wars and rumours of wars" ought not to stand in the way of this effort to awaken interest, spread knowledge, and foster trade.

Much effort and enterprise have been devoted by the British Electrical Development Association to this project, for which the time is ripe.

The writer's memory goes back to the historic Electrical Exhibition at the Crystal Palace. In days when it was usual to remark that "electricity is in its infancy" it excited immense interest.

The opportunities for an effective display are infinitely greater now. A successful show should, however, be based on demonstrations of applications of electricity; it should excite interest and wonder by showing *what electricity can do*.

This applies with special force to the proposed Lighting Section, in which this journal and the Illuminating Engineering Society are chiefly interested. The public soon wearies of masses of lamps and forests of lighting fittings. But it would show keen and sustained interest in attractive displays featuring applications of light.





Brightness Ratio and Brightness Difference

In glancing over past records of the Illuminating Engineering Society it is occasionally disconcerting to find how many of the problems of to-day were being actively discussed years ago—a study, for example, of the discussion following the original paper by Sir John Herbert Parsons on "Glare" (the first ever read before the Society), in 1910, would be a revelation to many. There is, however, one field that was hardly touched in those early days—the conditions governing the visibility of objects. It is true that even to-day we are still feeling after a definition and means of testing visibility, but we are coming to understand more of the part played by brightness ratio and brightness difference in enabling objects to be distinguished on the highways and elsewhere. One important consideration is the difference in appearance of two adjacent objects, each having a definite reflecting power, at high and low illuminations or the comparative effect of two objects, themselves luminous, when the brightness of each is raised in a given ratio—a phenomenon that may have an important bearing on our conceptions of glare.

Tone Reproduction in Photography

These considerations play an important part in photography and, indeed, in all pictorial reproduction. The subject has been recently treated in a masterly paper before the Royal Photographic Society by Mr. Ralph Hopkinson, whose previous I.E.S. contribution will be remembered by readers. Difficulties arise at once from the fact that in such reproductions the range of brightness is limited. (Mr. Hopkinson showed this admirably by means of photographs of a cliff scene; when the cliff was correctly shown the details of an adjacent and brighter pinnacle were lost and vice versa.) A very much more satisfactory effect may be secured when translucent positives, illuminated from behind, which permit a much greater brightness-range, are adopted. This is a common experience in dealing with photographs of artificial lighting installations. But it has also been suggested—and Mr. Hopkinson's paper seems to con-

firm this belief—that the effect of a picture or photograph on the eye may be profoundly altered by viewing it under an exceptionally high illumination instead of in a relatively dim light—though in fact the brightness-ratios in the picture remain the same throughout. This is a matter which should certainly be studied by those concerned with the lighting of places where exhibitions of pictures or photographs are constantly made.

The Coronation Lighting

We are deferring descriptions of the Coronation lighting until our next issue, in which a fully illustrated account will appear. In the meantime, those who attend the annual meeting of the Illuminating Engineering Society on May 19 will have an oppor-

I.E.S. Items

May 19th, 1937. The **Annual General Meeting**. Presentation of Annual Report of Council and Formal Business, followed by illustrated contributions describing the **Coronation Lighting**. (In the Lecture Theatre of the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1); **6.30 p.m.**

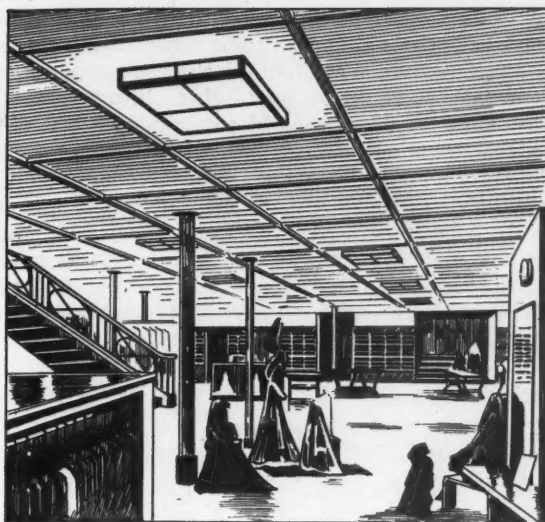
July 16th, 1937. **Proposed Visit to Paris** to view the **Exhibition Lighting**. Members who wish to take part are requested to send in their names by May 24th, 1937.

tunity of studying illustrated descriptions of buildings of outstanding interest. We understand that the proceedings will be opened by a series of contributions, each of about ten minutes duration, after which there will be a discussion. (The authors of the initial contributions will, no doubt, make the best of their time by concentrating on installations of special interest and not attempting to show too many slides nor to describe too much!) We gather that a number of engineers from overseas interested in lighting will be amongst the audience, and we hope that some of them will contribute their quota to the discussion.

Light in Daily Life

(VI) Light The Salesman

"What d'ye Lack?"—Appeal to The Eye instead of The Ear—What a Shop Window should Do—A Display not a Catalogue—Lighting Windows during the Day—Minimising Reflections in Window Glass—Appearance of Colours by Daylight and Artificial Light—Illuminated Signs and Canopies—Effect First: Cost Second.



The shops of the Middle Ages must have been dim and dusty places. One need not go further back than Dickens to picture their interiors in the days before gas mantles or electric lamps were available—in "The Old Curiosity Shop," and still more in the eerie description of Mr. Venus's shop in "Our Mutual Friend" we have a glimpse of dens seen by candle-light, sparsely visited and rarely cleaned.

In the modern store abundant access of daylight—buildings are designed primarily with this end in view—and ample artificial lighting at least ensure—that dirt and dust are visible, and even delicate articles can be kept in good condition. But the generous standard of lighting in a modern shop does far more than that. As articles can be clearly seen, prompt decisions are possible. Less time is wasted in close inspection of material. Better light means quicker sales. It has also a potent psychological effect. On entering a well-lighted store, the customer is involuntarily cheered and impressed. Without being aware of it, his mind assumes an optimistic tinge. He is already disposed to make purchases.

Shop Window Displays.

Even more striking, however, than the change in the lighting of interiors of stores has been the development in window lighting. Originally, one gathers, a merchant relied mainly on the lusty voices of his apprentices to attract attention. "What d'ye Lack?", repeated with emphasis, served, in a small way, the purpose of the modern illuminated sign or lighted show-window. With the coming of gas and electricity the appeal to the eye began to replace the claim on the ear. But for a long time—indeed, even to-day—there was confusion between distinct things. The light itself was considered first and foremost as a means of attraction; its use in illuminating the contents of the window was secondary. Then the effort was made (and still is made!) to make the light achieve both objects, so that bare electric lamps were crowded into the window amongst the goods. Only of late has the merchant learned to use lights *separately* for the two objects—to rely on illuminated signs above the window to attract people from afar and on skilfully concealed

lights to exhibit the contents of the window when they have arrived.

To-day, in every up-to-date store, the windows are regarded as a miniature stage. The aim is to concentrate light on the goods. The sources themselves are hidden so that their glare cannot distract the eye. Yet the windows, whilst free from glare, may be so bright as to bring people across the road as well as effectively displaying the goods to people when they have arrived.

The alleged attractive power of bright lighting is no illusion. Observations have shown that the number of people who assemble outside a shop window definitely increases when the illumination is raised from a weak to a moderate value, and again increases when "super-illumination" is attained. Extra lighting in the vicinity of a shop serves the same purpose. What is known as "parade lighting"—extra lighting from lamps on posts along the kerb of pavements in shopping areas—is sometimes provided at the request of merchants in that area, who meet the expense of this additional to the ordinary public lighting.

A Display—Not a Catalogue.

Improvements in shop-window lighting have been encouraged by the change in view as to the purposes which such windows should serve. At one time it was almost invariably assumed that the window should act as a catalogue—the owner of a shop tried to cram into his windows specimens of almost everything that he had to sell. Naturally, this effort was hardly consistent with very artistic treatment of the contents of the window, and it often made lighting difficult, especially when goods were brought up close against the glass. Nowadays, it is much more usual—certainly in the large stores—to use the window space for the preparation of some striking and artistic effect, often achieved with only a few well-arranged articles. The lighting should be an integral part of such a display, and should, therefore, be capable of wide variation according to the theme. In many cases what is needed is simply to flood the window with plenty of well-diffused light from concealed sources, so that the contents of the window stand out with soft but perceptible shadows. Occasionally, however, there are objects in the window that need to be picked out by a small spot-

light, in the same manner as figures of actors on the stage. Occasionally, a contrast, either in brightness or colour, or both, is aimed at; some object being caused to stand out vividly against a darker background, or, by means of coloured spot-lights, illuminated in a tint differing from that of surroundings but harmonising with them. Whilst the exhibition of unduly bright objects, such as unscreened electric lamps, amidst the contents of the window, should be strictly tabooed (the only effect being to distract attention and weary the eye), it is often permissible to make use of mildly bright translucent objects, such as small signs and the like, for the sake of creating contrast and relieving monotony.

Artificial Lighting—By Day as well as by Night.

It has now become a usual practice to arrange, by means of time-switches, for illuminated display windows to be kept lighted after busiest hours, and most electrical supply undertakings quote special terms for electricity thus consumed. There can be no question that such a display forms one of the cheapest and most effective of advertisements. The same consideration has led some stores to make use of artificial lighting whenever daylight is subnormal—for example, during the winter season, when dull days are frequent. There is another object in making use of artificial lighting during daylight hours, its help in rendering less conspicuous the reflections of bright objects, such as the sky, vehicles in the street, or adjacent buildings, in the shop windows. The greater the brightness of the contents of the window the less evident do these images of external objects appear. With very bright interior lighting their effect on the dull day can be considerably lessened. In bright sunlight, when these images are, of course, most troublesome, a very exceptionally high illumination—perhaps as much as 500 foot-candles—might be needed to have any substantial effect.

We have spoken so far mainly of considerations of *brightness* of light as a selling force in shops. Nowadays 10-15 foot-candles is quite a usual figure in the showrooms and 50 foot-candles or more not unusual in windows, while for special cases (when, for example, illumination during daylight hours and obliteration of images in window glass are aimed at) the illumination may well run into hundreds of foot-candles.

Appearance of Colours.

But the colour of the light is also of moment. There has been much discussion from time to time of the effect of the peculiar light furnished by the new electric discharge lamps, using mercury vapour, which contain practically no red rays. No one would suggest the use of such lamps in shops and stores where the appearance of colours is of any importance. It has even been suggested that their use for public lighting in shopping districts is inadvisable. There seems, however, to be little ground for this last suggestion, for the value of the illumination furnished by such lamps, mounted as they are, on posts 20 ft. high or more, will almost always be negligible in comparison with that furnished in the brightly lighted shop windows. Their effect on coloured posters and advertisements in streets is certainly a consideration; but it may well be urged that it is not the object of public lighting to illuminate advertisements, and that those interested in their display

should therefore do as the shopkeeper does—provide their own lighting, which will render the effect of public lamps negligible.

For most everyday purposes the light from ordinary incandescent sources (mantles or filaments), which is approximately white in colour, serves well enough. It ought, however, to be emphasised that whenever the colour of the goods purchased is an important consideration, the distorting effect even of so-called white artificial light, in comparison with daylight, should not be overlooked. By the use of scientific filters light from ordinary incandescent sources can be brought into close resemblance to daylight. Some areas equipped with this "artificial daylight" should be available so that the comparative appearance of coloured objects, in natural and artificial light, may be studied.

It should not be assumed that the natural appearance of colours in daylight is the sole consideration. It is often more important that the appearance by artificial light should be known. Ladies' evening dresses and flowers for table decoration are instances of things to be used and shown under artificial light. They should therefore be selected under ordinary artificial light rather than in daylight. On the other hand other things intended for display out of doors under natural light should be chosen either by daylight or by "artificial daylight," which comes fairly near to it. There differences in colour-value, by natural and artificial light, are by no means trifling, and have not infrequently been the cause of serious disputes. It is important, therefore, to ensure that light, when serving as a salesman, does not mislead the customer!

Illuminated Signs and Canopies.

In what has been written above the services of light as an aid to salesmanship in shops have been mainly considered. But displays of light are used in many different connections in order to attract the public. Theatres and picture palaces, restaurants and places of entertainment of all kinds, habitually use light in this way. The cinema theatre—perhaps because this mode of entertainment was originally based exclusively on the appeal to the eye and is still mainly so—has always been a user of light on a large scale for purpose of publicity. The consumption of electricity in lamps used for some of the illuminated canopies installed by large picture palaces and stores approaches the entire public lighting load of some country towns! Of late much ingenuity and skill has been used in the design of these external decorations, combinations of neon tubes in varying colours being conspicuous. In all cases the aim is the same—to attract custom.

Illuminated signs have the widest application of all as "silent salesmen." Of late years the introduction of neon tubes in various colours, in combination with designs in filament lamps and illuminated transparencies, has enlarged considerably the variety of effects obtainable in signs.

Effect First: Cost Second.

In this case—as indeed in the case of almost all applications of light as a selling agent—it is true to say that, within limits, the cost of light is a secondary consideration. The dominant consideration is the effect; if this is exactly what is desired, then all is well.

MODERN STREET LIGHTING PROBLEMS

The Growth of Motor Traffic—Is Uniform Illumination Worth While?—The Effect of Modern Road Surfaces—Vision by Silhouette—High Road Surface Brightness—Limiting Glare—High Cut-Off and Close Spacing—Tests of Visibility—Best Angle of Maximum Candlepower.

Of the two papers read before the Illuminating Engineering Society on March 9, by Dr. S. English and by Mr. R. Maxted, the former and longer one, being of a more controversial nature, formed the main topic of discussion.

In the early part of his paper Dr. English recalled several influences that have profoundly affected street lighting practice. Chief amongst these has been the tremendous increase in both goods and passenger motor traffic, which has led to roads being used, to an extent formerly undreamed of, during the hours of darkness. At the same time—perhaps because of this fact—lighting is no longer the "cinderella of public services," but is now regarded with more respect. Mechanical advances during recent years have been considerable. This has led the Society to set up a section devoted to public service lighting, where all such matters may be impartially discussed.

Uniform Illumination.

Street lighting became a serious technical matter with the introduction of light-controlling and redirecting equipment. In this connection the author referred to the pioneer work of a former president—Mr. A. P. Trotter—as far back as 1884. The avowed aim of early workers was to produce uniform illumination on the roadway (10 to 1 being regarded as reasonably good). When diffusely reflecting surfaces (such as relatively rough concrete or granite setts) are in use approximately uniform illumination along the roadway still gives satisfactory results—from the standpoint of the pedestrian who wants to see things near at hand, and also from the standpoint of the motorist who wishes to see further ahead. Early workers, however, whilst aiming at uniform illumination, were conscious that intense beams of light were apt to cause glare unless the angle of elevation was carefully controlled. In well-designed directional lighting fittings the main beam was generally projected at about 15° below the horizontal. At this angle glare was not usually serious unless the beam was excessively intense and the mounting height too low, and spacing-height ratios up to 8 were feasible.

Effect of Polished Road Surfaces.

The widespread use of road surfaces of such materials as tarmacadam and asphalt, which become polished after being subjected for some time to heavy motor traffic, has led to the resurrection of theories of street lighting based on road surface brightness. In this connection the author quoted a number of papers from 1919 onwards. Preston Millar, for example, whilst recognising the value of a bright background in producing a clear silhouette effect, pointed out that (1) different types of road surfaces produce widely different effects; (2) wet road surfaces, which are of frequent occurrence, produce entirely different results from those produced by dry surfaces; and (3) glare needs to be very carefully controlled. The same author, in 1929, patented a unit equipped with a shield to diminish glare. At the meeting of the I.C.I. in 1935 Peri also recognised that the pursuit of



This photograph was taken on the occasion of the meeting of the I.E.S. local centre in Dublin on March 23rd when Dr. English's paper, presented originally in London, was again read. Dr. English is seen seated on the left and Mr. F. X. Algar, who presided, on the right. Mr. J. Creagh, the honorary secretary of the Centre, is standing between them.

high brightness of the road surface is not without drawbacks.

High and Even Road Brightness.

During recent years the importance of high and even road brightness has been much emphasised, but the question of glare has been insufficiently considered. The statement is frequently heard that a particular type of polar curve is necessary to produce the desired brightness conditions—yet the distribution of such brightness may be entirely altered by a simple repair of the surface or even by a shower of rain.

Nevertheless, it must be agreed that road brightness is a very important factor in assisting silhouette vision and producing brightness contrasts by which obstructions are seen on roadways, though in town and populous areas, where the road surface forms only a small proportion of the total background, a form of lighting different from that desirable on motor roads may be desirable, and uniformity of illumination is of greater importance.

Avoidance of Glare.

The suggestion has been made that fittings should be so designed as to produce uniform glare. It has also been contended that absolute freedom from glare is the first essential—an attitude which has been strongly expressed on the Continent. As a result of the latter idea, opaque reflectors with a definite cut-off below the horizontal (sometimes modified by a band of diffusing glass) have been widely adopted. Reflected light is then directed to the roadway at relatively steep angles. The method necessitates a small spacing-height ratio, in the neighbourhood of 4 : 1, so that higher mounting-heights and closer spacing than are usual here must be adopted. It is evident that this method must be relatively costly, and that unless exceptionally close spacing can be used "spotty" effects and "pools of darkness" are apt to arise.

Such principles as those indicated above are all means to an end. The real aim of street lighting is to enable road users to see clearly what they need to see, especially obstacles that may be dangerous.

The pedestrian must be considered as well as the motorist, who, like the pedestrian, often needs to see clearly objects quite a short distance away, and not only those a quarter of a mile ahead.

Experimental Tests of Visibility, etc.

In the next section of the paper Dr. English dealt with the extremely difficult problem of determining experimentally what constitutes good street lighting, and described a series of tests which he had himself conducted. These were undertaken on a small model road with a width of 7 ft. and a length of 100 ft., which, by means of a mirror, could be extended to an apparent length of 333 yards, and equipped with foot-paths, each 1 ft. wide. Arrangements to permit various types of installations were adopted.

In the case of each test (a) details of the lighting equipment, type and size of lamp and fitting, "cut-off" (if any), mounting-height and distance apart, etc., were recorded; (b) illumination readings were taken at fifteen marked places as well as B.S.S. test points, and from them isolux diagrams were prepared; (c) surface brightness readings were taken initially, but it was subsequently found that they were of small utility in this case, and they were abandoned; (d) an attempt was made to get a numerical measure of visibility of objects at various places by observation of a small grey disc with an aperture in its periphery. This could be rotated by a motor so that the position of the small square aperture could be changed from time to time; (e) an effort was made to assess the glare in terms of the total amount of direct light striking the eye—light from the roadway, which acts in the opposite sense and tends to mitigate glare, being separately recorded. From these data a "glare index" was deduced; (f) photographs of each

installation, under standard conditions, were taken; and (g) the polar curve of the fitting on test was determined.

Best Angle of Maximum Candle-Power.

The results of these tests were illustrated by a series of sheets on which all the data gathered under the above headings ((a) to (g)) were assembled. Dr. English admitted the difficulty of drawing very definite conclusions from the data so far available, but pointed out several tendencies—for example, that in several cases the glare index tended to increase as the angle of the maximum beam was raised, so that the advantage of greater road surface brightness was partially lost, and ultimately the visibility tended to fall. On the whole the ideal angle at which beams should be emitted in order to give the best compromise between road brightness and glare appeared to be in the neighbourhood of 75°.

Lantern Characteristics.

The other paper, by Mr. R. Maxted, recalled a previously described research designed to ascertain the impressions of the average observer in a street, and to correlate these with technical data. He, too, emphasised the importance of careful lantern design in order to achieve a compromise between surface brightness and glare and of the selection of suitable methods of recording the design and characteristics of installations. The polar curve or iso-candle diagram is essential in studying glare, and the iso foot-candle diagram for the study of distribution of light. Mr. Maxted accordingly suggested a method based on the use of a modified iso foot-candle diagram and a vertical polar curve.

Street Lighting Conference at Newcastle

On March 8 Mr. E. C. Lennox, on behalf of the Northern Counties Area of the B.E.D.A., welcomed over 200 visitors to a Conference on Street Lighting in Newcastle-on-Tyne. Many representatives of local authorities were present.

In his opening remarks Mr. Lennox drew attention to the enormous increase in the volume of traffic on modern highways, the great increase in the number of accidents, and the vital importance of good artificial lighting. He recalled the difficulties arising from unequal treatment of adjacent areas and the Trunk Roads Act of 1936, giving power to the Minister of Transport, from April 1, 1937, to take over and maintain certain national highways. Unfortunately, it does not follow that the Minister will also be responsible for the lighting of these roadways. "Maintenance" apparently does not include lighting! The Minister has power to provide better lighting on a section of roadway if he thinks necessary—and can provide the expense—but it is unlikely that advantage will be taken of this clause until the Ministry of Transport Departmental Committee on Street Lighting has issued its final report.

Following Mr. Lennox's address, Mr. Aldington, of Siemens Electric Lamps and Supplies, Ltd., gave a lecture reviewing recent developments in street lighting with electric discharge lamps, and Mr. G. F. C. Lucas, of the British Thomson-Houston Research Laboratories, showed an interesting film, representing a tour of artificially lighted streets, in the course of which the importance of road brightness, background, and careful design of public lighting installations was clearly illustrated.

Those present were afterwards afforded an opportunity of seeing the modernised street lighting centres at Walker, inaugurated by the Lord Mayor of Newcastle in November last.



Improved Lighting at Wembley

This illustration shows the greatly improved system of street lighting now in operation at Harrow Road, Wembley, employing 127 BTH Dilen Lanterns, each equipped with one 250-watt Mazda Mercra Lamp. Since this photograph was taken The North Metropolitan Electric Supply Company have placed a further order for 173 complete units for use in Fryent Road, Bridgewater Road, Park Lane, Salmon Street and Harrow Road (continuation).

Modern Street Lighting with Gas

Growing Importance of Street Lighting—Modern Gas Lighting Equipment—Directive Reflectors and Refractors—Overhead Central Suspension—New High Pressure Mantles—Costs of Public Lighting—Eliminating the By-pass.

It is not so often that informative papers dealing with street lighting by gas are presented. A recent paper read before the Junior Gas Association by Mr. K. G. Bodiley, of the Weston-super-Mare and District Gas Company, and entitled "Some Modern Methods of Street Lighting," therefore deserves notice.

In his opening remarks the author recalled that the subject of street lighting had never been discussed by that association. It is, in fact, only during recent years that the subject has come to be regarded as important, owing to the growth of street traffic. In the days of the upright mantle and the lamplighter stick street lighting was hardly a science. As a rule the only direct interest in street lighting a gas company had was to supply the gas. The maintenance and lighting of the lamps was done by a staff of usually unskilled men employed by the local authority.

The competition of electricity led the gas industry to make efforts, one result of which was the wider use of such devices as clock controllers, more efficient and reliable mantles, superheater burners, directive fittings, and overhead lighting. High-pressure gas has also been a potent factor. The issue of the British Standard Specification and the Interim Report of the Ministry of Transport Committee, from which quotations were made by the author, have also been of importance.

Modern Equipment.

Dealing in turn with the equipment mentioned above, the author stated that the use of clock controllers in general effected a saving of about 13s. a lamp, so that an installation should pay for itself in two years. Slow-action controllers have proved their value over many years; they are simple and reliable in action, and the cost of repairs (approximately 9d. per controller per annum) is low. Quick-action controllers have been applied in square-type lanterns during the past four years. They have distinct advantages in dealing with suspended lighting, and the effect of the instantaneous lighting up of lamps when thus operated is impressive. Other special forms of modified control (e.g., to reduce the number of mantles in action after a certain hour at night) were also briefly described. In regard to mantles, maximum efficiency combined with high mechanical strength are the chief desiderata; the latter is probably the more important in street lighting. Pre-heating the mixture of gas and air leads to higher flame temperature and greater incandescence from the mantles; savings in gas up to 20 per cent. may be thus obtained.

Directive Reflectors and Refractors.

Much effort has been devoted to the design of directive fittings, for which white porcelain, porcelain-enamelled steel, and stainless steel are the most commonly used materials. Reflectors for upright lanterns consist of facets of glass or plated steel fitted underneath or at the side of mantles. The position under the mantles is the more efficient, enabling increases in candlepower of 200 per cent., as compared with 50-75 per cent for the side positions, to be obtained. The cost of installation is well under 10s. per lamp, and the renewal costs a matter of pence only. The mirror glass type has been pre-

ferred to the polished steel type as being cheaper and costing less to renew. Actually the cost of renewals since 1933 has been about £4. Eight hundred lamps were fitted with this type of reflector at a total cost, including fixing, of £135, i.e., an average of 3s. 5d. per lamp.

Whilst such reflectors give fairly good light distribution they can hardly be described as pleasing in appearance—a drawback, when it is recalled that nine people out of ten, when inspecting an installation, persist in looking at the lamps instead of viewing the effect on the road surface! The use of glass refractors in gas lamps is a comparatively recent innovation. Refracting glass dishes underneath the mantles seem to give the best results. Correct setting of the dishes is, however, important, with a view to getting maximum test-point illumination.

Overhead Suspension.

The best way of lighting a street, as compared with a country road, is from overhead, and the time is probably not far distant when all important thoroughfares will be overhead lighting. The chief difficulty is the heavy initial outlay. Two alternative methods (1) suspension of lamps in fixed positions, involving the use of a tower ladder for maintenance; and (2) installation of some form of suspension gear enabling lamps to be brought to the kerb-side for cleaning and adjustment. The merits of the two methods depend on local conditions, one important consideration being the interference with traffic, which the use of towers involves. Provided the number of lamps is small, say, less than fifty, a ladder can be handled in most weathers by two men; but for a larger number of lamps, spread over a greater area, it is necessary to tow the ladder by means of a lorry. Tower ladders are extensively used in the maintenance of overhead electric lamps, but in the case of gas lamps some form of suspension gear is usually preferable. Two methods are in use at Weston-super-Mare. In one case the lamp is brought to the side of the road and lowered by a winch. It is necessary to break the gas connection before lowering the lamps, and to relight the by-pass afterwards. A second system utilises a lamp suspended from the end of an overhead gas supply pipe. In this method, which was finally preferred, there is no interruption of supply, the lamps being quickly hoisted or lowered but without traversing.

High-Pressure Mantles.

After briefly describing high-pressure systems, control being effected by a pressure-operated governor, the author discussed high-pressure mantles, which are made of artificial silk, and when burnt off are ordinarily about four inches long, a shape not well adapted to the use of directional reflectors. The Metro-Supervia high-pressure lamp represents an attempt to modify the mantle, which is of rectangular shape and fixed broadside to the road. Under the mantle a refracting dish is applied, and a maximum candle-power of 4,000 is thus obtained. There are at present twenty-nine such lamps in Weston-super-Mare. Owing to the shape of the mantle it is rather easily destroyed by wind, which explains the rather high mantle-consumption. Experiments with a mantle-shield, which it is hoped will diminish these

costs, are now being made. This mantle is considered to have a great future for street lighting, both for low- and high-pressure work.

Costs of Public Lighting

In the concluding part of the paper something was said in regard to costs of lighting. The three chief items to consider are (a) capital cost, (b) running cost, and (c) maintenance or upkeep costs. It should be the aim of every undertaking to obtain as long a contract as possible, so that the capital expenditure may be spread over a number of years, thereby enabling the undertaking to offer the most favourable terms, as well as getting greater security. Until such time as financial aid from the Government is forthcoming, the capital cost involved is nearly always borne by the undertaking.

Running cost has been the subject of much discussion, and prices vary widely. The lighting load does not normally occur during peak periods, and is therefore a desirable load. There are 1,381 lamps in Weston-super-Mare, of which 1,149 are column lamps, 159 are low-pressure suspension lamps, and 73 high-pressure suspension lamps; the lighting time amounts to 1,600 hours per annum, and the lamps are maintained by six attendants. Arrangements are made for every important road to be inspected every night, and all side roads on two nights out of three. It is important for the gas consumption of every lamp to be known. Nipples are standardised, $1\frac{1}{2}$ cubic feet per hour being allowed for a No. 1 size nozzle, and $2\frac{1}{2}$ cubic feet per hour for each No. 2 nozzle.

The estimated gas consumption of street lamps in Weston-super-Mare is 17,685,000 cubic feet, which is 3.38 per cent. of the total gas sold. Of this, 17.6 million cubic feet used in street lamps in 1936, about 14 per cent. was used in by-passes. The use of the catalytic by-pass (which eliminates the permanent by-pass, the by-pass flame being lighted for a few seconds by means of an electrically heated filament at the time the main gas supply is turned on), is finding increased favour for street lighting. It is claimed that the by-pass-gas is reduced to a figure of 0.0005 cubic feet per day. This is, however, a delicate bit of apparatus which the average lamp attendant does not understand. It should also be considered that a permanent by-pass flame prevents condensation inside a lamp owing to sudden changes in weather conditions.

The Design of Industrial Lighting Fittings

An excellent talk on this subject was given by Mr. W. R. Stevens at the meeting of the Industrial Lighting Section of the Illuminating Engineering Society held at the E.L.M.A. Lighting Service Bureau on April 21.

In his introductory remarks Mr. Stevens listed the chief factors in industrial lighting as follows: (1) Amount of Light, (2) Glare, (3) Shadow, (4) Maintenance, (5) Appearance, (6) Nature of Light, and (7) Cost. (There was some argument about the order of these points—especially the last one!) The address consisted of a survey of these factors and was aided by a number of demonstrations. Very effective, for example, were the manner in which a fitting was built up in stages round the bare lamp, the polar curve being roughly determined on the spot in each case, the device whereby, by the aid of a very narrow beam, the reflecting qualities of various materials was shown; and the demonstration of the dissipation of heat in a typical industrial lighting fitting.

There was a keen and entertaining discussion which was opened by Mr. A. R. McGibbon. Others who spoke included Mr. W. J. Edwards, Mr. P. S. Barton, Mr. C. A. Morton, Mr. J. S. Dow, Mr. A. R. Iliffe, and Mr. G. H. Wilson. Several speakers raised

the question why values of illumination tend to increase year by year and limitations, in the form of glare and heat, were suggested.

A vote of thanks to Mr. Stevens and to the E.L.M.A. Lighting Service Bureau, whose equipment once more proved to be of signal service, was voiced by the chairman (Mr. R. O. Ackerley).

The Lights of Lambeth

Lighting with electric discharge lamps is being installed in about $35\frac{1}{2}$ miles of main traffic routes in the Borough of Lambeth and also in its secondary thoroughfares, including passages and alleyways. (This is said to be the first time that small alleys and passages have been lighted in this manner in a London borough.)

The new lighting was inaugurated on April 7 when Alderman F. W. Mills, the Mayor of Lambeth, operated a switch in St. John's Hall, Rosendale-road. A tour of the district was subsequently made by those present. In all, some 1,040 new units are to be installed,



250-watt OSIRA electric discharge lamps in a residential area at West Norwood.

900 new columns have already been erected at the rate of thirty to forty a day, and the scheme should be completed by June 30.

In the main thoroughfares 400-watt and 250-watt Osira electric discharge lamps will be used, and the installation will conform to the M.O.T. Committee's recommendation for Class E and F streets. All units will be mounted 25 ft. above the roadway on arms projecting 6 ft. 6 in. In secondary streets 250-watt lamps, mounted at a similar height, will be adopted. All the lamps are being housed in specially designed G.E.C. Di-fractor lanterns.

Home Office Industrial Museum

For the benefit of many visitors to London during the present month who will doubtless be making a tour of the chief museums, etc., we may recall one of a unique character—the Home Office Industrial Museum in Horseferry-road, Westminster, which is open daily on week days from 10 a.m. to 4 p.m. This exhibition of safety, health and welfare appliances, which serves as a permanent guide to advances in this field, has recently been rearranged and extended. New types of machines, guards, illustrations, and photographs have been added. In addition, we should like to recall especially the exhibit in the basement which is devoted to lighting, and contains many useful models illustrating fundamental points. Visits by parties, who will be conducted round by inspectors of factories, can be arranged by appointment.

DESIGN for LIGHTING

and the Interim Report

EXTRACT "(10) The positioning of lamps should be studied with a view to securing the best visibility, rather than uniform spacing, but normally the distance between lamps should not exceed 150 ft."

The combination of ELECTRIC LAMPS and LANTERNS provides the latitude desirable for variable spacing with a reasonable number of posts; sufficient light is readily and economically available to provide excellent lighting and visibility with 150 ft. spacing.

"(11) On bends the lamps should be placed on the outside of the curve; the provision of artificial backgrounds in appropriate cases and of white kerbs at bends should be considered."

The photograph below is a typical example showing how Electricity fulfils these requirements.



Lillie Road, Fulham, S.W.6.



ELECTRIC

STREET LIGHTING

satisfies every requirement

Announcement of the British Electrical Development Association Inc.
2, Savoy Hill, London, W.C.2. Temple Bar 9434.

New Lighting in the Euston Road (London)

A Class "C" Installation

Yet another step towards improved lighting in London was initiated on April 2, when the new lighting system in the Euston-road was formally switched on by the Mayor of St. Pancras (Alderman R. F. W. Fincham), in the course of a gathering at the Euston Hotel. Some general remarks had previously been made by the Chairman of the Electricity and Public Lighting Committee (Mr. Alderman J. H. Mitchell). Subsequently, a general description of the installation was given by Mr. C. Hughes (Siemens Electric Lamps and Supplies, Ltd.), and everyone then passed out into the Euston-road to examine the effect of the new lamps for themselves.

The new installation utilises 400-watt Siemens' Sieray electric discharge lamps in special (Regent Sieray) lanterns. These high-pressure mercury lamps, it may be recalled, give a light output of 18,000 lumens. The current is controlled by choke coils of the variable air gap type, and power factor rectification is effected by means of metal shrouded condensers. This control apparatus is housed in the bases of the columns.

A feature of this installation is that it is not merely an adaptation of electric discharge lamps to the previous installation of gas-filled (filament) lamps, but has been redesigned throughout. Certain island sites, however, are fixed positions that had to be used in the new layout, owing to the presence of Underground Railway air vents that could not be disturbed. By careful design these fixed sites have been fitted into the scheme in their proper positions with regard to the remaining points. In such cases the existing columns were adapted for use in the new installation, and the new columns have been designed to match in with the old ones.

It will be noted that brackets of the swan-neck type are mounted on the columns, an arrangement



His Worship The Mayor of St. Pancras (Alderman R. F. W. Fincham) switches on the new lighting in the Euston Road.

which is finding favour in the case of many installations of discharge lamps. The light from the lamps is directed by means of prismatic glass panels incorporated in the lanterns, which give an asymmetric light distribution with the main beams at 160° to each other. The polar curve is such as to ensure that the main distribution is spread over a fairly wide angle towards the centre of the road, thus ensuring even illumination of the road surface and absence of inequalities.

Good features are the absence of glare and the even distribution, producing an effect of high visibility. The installation falls into Class "C" of the British Standard Specification, the minimum test point reading being 0.6 foot-candles, and the maximum illumination about 2.3 foot-candles. The variation is thus of the order of 4 to 1 only, a value that would have been considered quite remarkable only a few years ago.



A General View of Euston Road, showing the effect of the new lighting with "Sieray" electric discharge lamps.

Mr. W. J. Jones in America

Mr. W. J. Jones, the manager of the E.L.M.A. Lighting Service Bureau, who left for the United States on March 31, is expected back in London very shortly after the Coronation. We understand that one of the chief objects of his tour is to study methods adopted in the United States, notably, in connection with their campaigns for better lighting. One gathers that a distinctive feature of American efforts is the importance attached to the personal call. Women demonstrators, for example, have been widely employed in making calls at homes and in giving advice on lighting difficulties. It will be interesting to learn how far such methods are considered applicable in this country.

Television Images

We must defer until next issue our notes on the very informative paper on the above subject of Mr. L. C. Jesty and Mr. G. T. Winch, read at the meeting of the Illuminating Engineering Society on April 13. As one has learned to expect from the G.E.C. Research Laboratories, the demonstrations were remarkably well staged and most effective. Members learned something on what was, for most of them, an unfamiliar topic, and the audience—probably the biggest of the session, was keenly interested in the television displays following the meeting. This broadcasting of pictures is surely one of the most miraculous things of the age, and ranks high as a scientific achievement, even though, admittedly, the best may be still to come. No doubt a larger picture is only a matter of time and there will be other great advances in technique during the next few years. The authors, for instance, did not discourage the hope that pictures in natural colours might eventually be forthcoming.

Women's Interest in Lighting

At a recent gathering of women interested in lighting, convened by Miss D. M. Noakes of the E.L.M.A. Lighting Service Bureau and Miss Halpin, of the Women's Gas Council, Mr. A. Cunningham gave a short address on the importance of women's co-operation in present-day lighting problems. He pointed out that, although it was natural to think of home lighting as being the particular province of women, there were many other aspects of lighting in which it was desirable to have the advantage of the woman's outlook, and he hoped that further co-operation might lead to progress in directions not hitherto developed to any great extent.

The advent of women in architecture undoubtedly had a useful effect, and he anticipated that if women had more direct concern with lighting greater attention would be paid to such questions as the facility for upkeep and cleaning in lighting fittings, convenience in the arrangement of plug sockets and other connections, and extended applications of utility lighting. It was also desirable to interest women concerned with welfare work and with safety in factories and workshops in modern lighting developments, so that they may be more fully aware of present-day possibilities. Decorative lighting was another field in which women's co-operation would be helpful.

Mr. Cunningham recalled that the founder of the Illuminating Engineering Society had in mind from the very beginning the possibility of women members, and that the Society had had the benefit of hearing the woman's point of view in discussions on various occasions. They had recently formed sections dealing with special aspects of lighting which might be of particular interest to persons who might not be interested in illuminating engineering as a whole, and this move had resulted in a number of new adherents. Whilst the Council did not think it advisable to form a section exclusively for women or for dealing solely with domestic lighting, the newly-formed decorative lighting section would, he thought, provide a suitable link with those already connected with the women's lighting circle. He extended a cordial invitation to the members of his audience either to join the Society as full members, or, if not, at least to come to the meetings of the decorative lighting section, the programme of which was now being formulated.

I.E.S. Visit to Kodak Laboratories

On April 6 members of the Photometry Section of the Illuminating Engineering Society paid an entertaining visit to the research laboratories of Kodak, Ltd., at Wealdstone (Middlesex). After assembling for light refreshments, the party made a tour of the works and were most interested in the special apparatus for exposing, developing, and testing films, producing films of graded density, etc., and in the elaborate arrangements made to ensure constancy of temperature and humidity. Subsequently a talk on "Photographic Photometry" was given by Mr. E. W. H. Selwyn, who gave an instructive summary of the behaviour of photographic materials when subjected to illumination. He pointed out that, over a certain range, there is an almost linear relation between the logarithm of the intensity and the density of a photographic record, and indicated the application of this to the methods adopted by Mr. Hopkinson for photographs of lighting installations. Other diagrams contrasted the sensitiveness of photographic materials throughout the spectrum with that of the human eye, and reference was made to the production of special plates and films giving a nearer approach to visual sensitiveness. Some very interesting pictures were shown illustrating what occurs in the course of development, the nature of the image composed of fine grains of silver, and the limits affecting the reproduction of fine detail. Allusion was made to the great variety of factors influencing the final result when a photograph is taken and the necessity of scrupulous care when comparative effects are to be studied.

In the course of a subsequent brief discussion, Mr. H. Buckley mentioned the Purkinje effect as yet another disturbing factor affecting the contrast between what was observed by the eye and what was recorded on the plate. Mr. J. M. Waldram gave further instances of the general similarity of the photographic plate to the human eye, and explained how advantage of these conditions had been taken in his work on the measurement and distribution of brightness over an artificially illuminated street surface. In this connection Mr. Waldram showed several slides, showing how the method of "photographic photometry" was applied.

Mr. E. Stroud, referring to the sensitivity of plates subjected to coloured light, pointed out the difficulties involved in taking photographs of street lighting, where sources of light having such dissimilar spectra were now employed; and Mr. Dow pointed out the great difficulty in getting a satisfactory photograph on which both the surfaces illuminated, and the actual sources were shown with fair fidelity. Allusion was also made to the apparent change in appearance of photographs with varying degree of illumination.

These points were dealt with briefly by Mr. Selwyn, Mr. Hopkinson, and Mr. Davies (who presided over the meeting). It was suggested, for example, that Mr. Stroud's aim might be partially realised by using panchromatic plates, and that illuminated positives permitted a greater range of brightness in presenting pictures of installations. Mr. Hopkinson indicated that the effect mentioned by Mr. Dow would be more fully discussed in his coming paper before the Royal Photographic Society.

At the close of the discussion members were given an opportunity of seeing some very pleasing films and still photographs, executed in natural colours by a new process. A vote of thanks to Kodak, Ltd., and Mr. Davies terminated a most enjoyable evening.

Industrial Lighting Problems

In what follows we give a summary of several of the contributions, illustrating the solution of special problems in industrial lighting, presented at the meeting of the Industrial Lighting Section of the Illuminating Engineering Society on March 24th. The series will be completed in our next issue.

A PROBLEM IN THE CERAMIC INDUSTRY

A Combined Lighting and Dust-Protection Fitting

By T. C. Angus

This particular problem and its solution illustrates the inter-relation between medical, physical, and engineering practices in industrial physiology. The immediate problem here was not a lighting problem, but the problem of an industrial dust hazard met with in the ceramic industry. It turned out that a rather special form of lighting had to be devised in order to make usable the safety measures finally adopted.

When operatives are engaged in the act of "fettling" or cleaning pressed pieces by the use of hand brushes, their rough edges and fine irregularities, on being removed by brushing, give rise to a very fine dust composed of materials known to be dangerous to health when breathed into the lungs.

To overcome this danger an exhaust hood is provided, and a continuous but slow-moving current of clean air is drawn past the heads of the operatives from back to front. This means that no matter how much dust is being produced at the fingers' ends, no dust particles small enough to float in air will be able to pass through this barrage of moving air to the nose or mouth of the operative. It was thus found that dust counts of 13 million particles of dust per cubic foot of air, as breathed by the operatives, could be reduced to $3\frac{1}{2}$ millions, where the general air of the works contained a little over 2 million, and these last-named are known to be safe concentrations.

Now to consider the part played by light. It is, of course, unusual to see such objects as dust hoods suspended just in front of a worker's eyes. The introduction of such an object invariably brings complaints of shadow, obstructed vision, and general reduction of working efficiency.

In the hoods described, therefore, a directional lighting unit was incorporated. This not only produces some 40 or more foot-candles at the point of working with a reasonably bright background, but the beam of light is so carefully directed that on moving the work away from the effective area of the hood the work goes into comparative darkness. The result of this is that the workers hold the pieces under the influence of the hoods without being told to do so. There is also reason to suppose that, having regard to the type of lighting previously employed in these works, the output during dark periods will have been increased owing to the improved facility of seeing given by the hoods.



Courtesy: The Journal of Industrial Hygiene and Toxicology.

The hood shown in front of this worker in the Ceramic Industry serves a dual purpose, removing the greater part of the dangerous dust from the process and housing a local lighting unit which provides 40 foot-candles on the work.

THE INSPECTION OF SMALL SCREWS

By J. E. Lane

The difficulty experienced by the operatives when inspecting small screws and setting up thread-chasing tools on automatic screw-cutting machines was that owing to the small size of the screws they were not able to readily extract faulty products from the inspection trays. Under ordinary lighting conditions the threads appeared to be correctly chased, but a second careful inspection showed that the thread was only half chased. This second inspection caused waste of time. A special fitting was therefore designed to enable the cutting tool to be correctly set up, and also for a close inspection to be carried out if necessary. This has proved very satisfactory.

The fitting actually consists of an inverted trough, octagonal in shape, housing eight 15-watt Pigmy sign lamps. In the centre of the fitting is a 5-in. magnifying glass, which gives a high degree of magnification, and also provides a fairly large area of view. If a smaller glass were used the power of magnification would be greater, but aberration at the edges would become serious and give rise to distortion of the object being viewed. At a distance of one foot from the object an intensity of 105 foot-candles is provided actually on the object under inspection.

The actual size of the fitting supplied is 12 in. diameter, $3\frac{1}{2}$ in. overall depth. In the particular works referred to, it is suspended by two wires and counterweight, being pulled down in front of the machine-tool when required.

This fitting could, of course, be used for other types of work, such as inspecting old manuscripts, photographs, stamps, etc.

LIGHTING FOR A BELT SANDER

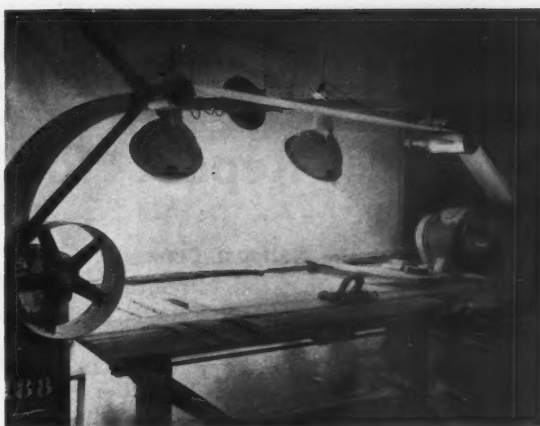
By W. Imrie-Smith

The problem in connection with the lighting of this machine is to provide an illumination which enables the operative to quickly detect unevenness in the finished surface of the wood. Virtually, the machine consists of a horizontal travelling sand belt, and the work is placed on a movable table just below the belt and the latter pressed on to the surface by means of pads. Apart from questions of overhanging machinery with its broad belt, the type of light required needed careful consideration. The final solution consists of placing two 100-watt parabolic angle reflectors on the opposite side of the machine to the operative so that they were directed away from him and illuminated a matt white surface about 2 ft. 6 in. behind the machine. The fittings were arranged about 2 ft. above the work bench and 2 ft. 6 in. apart. With this arrangement it is found that by pulling the work forward the operative could look along its surface and readily detect variations in finish by means of the reflection given by the diffused white surface on the opposite side of the machine. This inspection could, naturally, be carried out better when looking along the grain of the wood. During the operation the inspection is a necessity carried out with a cross-grain view, which, although not so good, was sufficient to detect the progress of the work, and the wood was then turned round to be viewed along the grain for the final inspection. When the machine is in operation a large amount of fine sawdust is naturally produced, so the two reflectors are equipped with dustproof visors as a suitable protection of their reflecting surfaces.

MOTOR-CAR BODY INSPECTION

By W. Imrie-Smith

A second problem, also dealt with by Mr. Imrie-Smith, related to the inspection of motor-car bodies. This inspection consists of the detection of unevenness of finish in a highly polished surface, and so, again, the problem consists of providing illumination at a suitable angle. Experiments showed that if the surface was illuminated by means of a floodlight, so that the inspector could see the surface at a grazing angle and yet just avoid the reflected image of the light source, the slightest variation in surface finish, or even deposit of grease, could be readily detected. This example is mentioned, as it is surprising how even an oil smear, which can only have an infinitesimal thickness, is sufficient to upset the light reflected, and thus renders it readily detectable. To obtain the necessary viewpoints on the vertical surface like the side of a car, two rows of Projectolux reflectors, with their ribbed glass fronts, are employed, one placed near the bottom of the car and shining upwards so as to permit inspection of the lower half of the surface, whilst a corresponding row above enabled the inspector to bend down and view the upper part of the body. As mentioned, an angle to bring the observer's eye just outside the light source image is necessary, so that the fittings are arranged close to the vertical side of the car, and with the spreader glass it was found that a lateral spacing of about 3 ft. was satisfactory. (200-watt lamps were used.)



This picture illustrates the method of lighting belt sanders. The fittings are here shown mounted for a test. In an actual installation they would, of course, be rigidly fixed. (The conical reflector visible at the back is not in use, but merely formed part of the original installation.)

(We hope in our next issue to deal with the remaining problems in this series, "The Equipment of the new Park Royal Works of Waterlow and Sons Ltd.," by L. M. Tye; "The Polishing of Stainless Steel Sheets," by E. L. Calvert; and "Some Applications of Gas Lighting in Factories," by J. B. Carnel.)

INDUSTRIAL LIGHTING IN MANCHESTER

A meeting of the I.E.S. Local Centre in the North Western Area, held in Manchester on March 23, was devoted to a general discussion on industrial lighting, the first item on the programme being a talk by Mr. J. D. Nettleton, entitled "Observations on Observation." This roved over a wide field, such topics as glare, intense local illumination, and effect of electric discharge lamps being discussed. Mr. W. A. Thurley followed with a contribution entitled "Illuminating and the Works Engineer," in the course of which a series of lantern slides, illustrating the solution of various problems (e.g., the lighting of drawing offices, milling machines, lathes and boiler yards), was shown and the question of maintenance was discussed. A third contribution by Mr. S. H. Packer dealt with a number of industrial installations of gas lighting in the Manchester district. We mean to deal more fully with these items in a coming issue.

ILLUMINATIONS IN COLOUR

Readers who have only a vague idea of what is being done in connection with seaside lighting would do well to take a peep at a booklet in colour issued by the British Electrical Development Association. Some of the schemes of colour lighting illustrated are striking to a degree. One of the most pleasing shows a glimpse of Hampton Court Palace, flood-lighted in red, through an illuminated grass avenue, with the foliage and flowers in white and green. We would also give good marks to the windmill at Blackpool for its colour scheme and to the "volcano" at Southend for ingenuity. A special colour-print of Southend viewed from the sea shows the complete scheme, which is said to have attracted as many as two million people and to have extended the season by at least two weeks.

National Illumination Committee of Great Britain

(Affiliated to the International Commission on Illumination)

Report for the Year 1936

(Slightly abbreviated)

Work of the National Committee.

IT is with regret that the committee has to report the death of Sir Joseph Petavel, the Director of the National Physical Laboratory, who has represented the laboratory since 1921. The committee has also to report other changes which have taken place in its membership during the year. Mr. H. Davies, Capt. W. J. Liberty, and Mr. R. Watson have resigned, and their places as representatives of the Institution of Gas Engineers have been taken by Messrs. J. E. Davis, E. V. Evans, and C. A. Masterman. Mr. Watson also represented the National Gas Council, and his place has been taken by Mr. F. C. Smith. Mr. J. G. Clark has replaced Mr. C. F. Botley as the representative of the British Commercial Gas Association, while Mr. A. R. McGibbon now represents the Society of British Gas Industries instead of Col. E. Wilson. Messrs. M. G. Bennet and A. Cunningham are now the representatives of the Railway Clearing House in place of Mr. A. H. Stevens and the late Major G. H. Spittle.

Mr. Watson's place as the representative of Great Britain on the executive committee of the International Commission on Illumination has been taken by Mr. C. A. Masterman. The vacancy in the office of vice-chairman has been filled by Mr. W. J. A. Butterfield.

Mr. Watson, too, has been a member of the committee since 1913, and has played a very active part in its work particularly on the street lighting sub-committee. He acted as the leader of the British delegates at the meetings of the International Commission on Illumination at Bellagio in 1927 and at Saranac Inn (U.S.A.) in 1928.

The committee has been instrumental in calling a conference to consider the question of the education and status of the illuminating engineer. A request to call such a conference was received in November, 1936, from the Illuminating Engineering Society, and the conference is called for January next. Invitations have been sent to a number of interested organisations as well as to certain individuals who are closely associated with this subject. The Association of Public Lighting Engineers is likewise taking interest in the subject, and the response to the invitations to attend has been such as to ensure a representative expression of opinion.

The main subject under discussion will be the possible institution of courses of instruction, leading up to examinations and the granting of a diploma in Illuminating Engineering.

The question of securing publicity for the work of the National Committee has been under consideration and a comprehensive survey, including proposals for its achievement, has been drawn up. A small committee has been formed to consider the practicability of giving effect to these proposals.

Work of the Sub-Committees.

Units and Standards of Light.

Proposals have been received from the leading national standardising laboratories with regard to a new primary standard of light and an agreed method of photometry. It is proposed that the unit of candle-power shall be defined in terms of the brightness of a black body operated at the temperature of freezing platinum. The value of this has been determined to be 58.9 international candles per sq. cm. and the suggestion is to adopt a value for the new

unit such that 60.0 "new" candles are emitted per sq. cm. By the adoption of this proposal, certain discrepancies in the unit of candle-power which have arisen between the various national laboratories will be either removed or reduced. The effect will be to lower the numerical values assigned to existing tungsten gasfilled standard lamps by about 2 per cent., while leaving those of tungsten vacuum standard lamps practically unchanged.

The proposal concerning an agreed method of photometry is that colour filters whose integral transmission ratios are computed from spectrophotometric data and the internationally-agreed visibility curve shall be used in the derivation of standard, differing in colour temperature from that of the new primary standard.

Street Lighting.

Great Britain is acting as Secretariat for this subject, and a questionnaire has been prepared and circulated to the other national committees.

Architectural Lighting.

A comprehensive programme of work has been planned; this includes a revision of the definition of architectural lighting and the collection of a number of photographs illustrative of the effect of artificial lighting upon decoration.

Aviation (Ground) Lighting.

This sub-committee has reviewed the present specification and the draft has been sent to other countries for comment. A questionnaire has been received from the Dutch National Committee.

Traffic Signals.

The present specification is under review with the object of including requirements as to patchiness, phantom signals, etc.

Lighting Education.

This sub-committee has taken an active part in the preparations for the Conference on Illuminating Engineering Education, and all its members have been invited to serve as delegates on that occasion.

Applied Lighting.

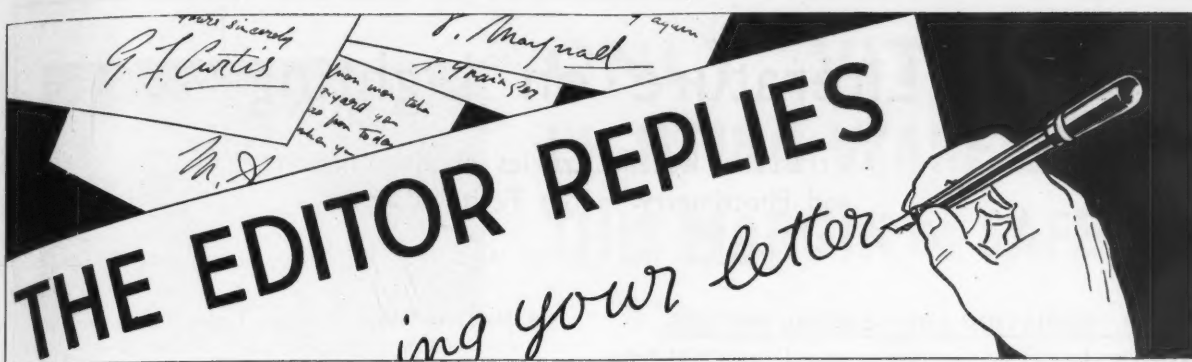
This sub-committee has divided its work into three sections: (a) railway lighting, (b) factory and office lighting, (c) school lighting, and a panel of the sub-committee is dealing with each part.

A conference on Better Lighting, held at Brussels in November, was attended by a representative of the National Committee, and a paper dealing with the co-operation between illuminating engineers and opticians was read by Mr. W. E. Bush.

General.

The National Committee has much pleasure in acknowledging its indebtedness to the three contributing bodies, namely the Illuminating Engineering Society, the Institution of Gas Engineers, and the Institution of Electrical Engineers for their continued interest and support, also to all those who do so much to further the work of the committee, and above all to the National Physical Laboratory and the British Standards Institution.

The Committee takes this opportunity of expressing its appreciation of the services rendered by the hon. secretary, Mr. H. Buckley, and the hon. assistant secretary, Mr. L. H. McDermott.



The recent series of **popular articles on lighting** in the "Evening Standard" gave rise to a good deal of comment. Our own view is that, taken as a whole, this enterprising publicity should do good, not only to the cause of better lighting, but to the Illuminating Engineering Society by making people more responsive to its efforts. Certainly our telephone seemed to ring almost continuously whilst the articles were appearing, and we should not be surprised if some members were obtained as a result.

It is no doubt true that almost all popular articles contain some mis-statements. Strictly accurate remarks usually contain more qualifications than are journalistically desirable. But we would cheerfully sacrifice a little accuracy to "get the message home." Appeals to the public must, we think, be written by the layman. It is almost impossible for a technician to divest himself of his knowledge to be readable and strictly accurate too.

We continue to receive inquiries in regard to **courses of instruction in illumination**. A hopeful sign. One correspondent—from the Far East—asks us where the most complete course in Europe can be obtained. We suppose at the Lichttechnisches Institut in Karlsruhe, which Professor Teichmüller made widely known. The short E.L.M.A. courses are admirable for those in the electrical industry. Prolonged courses do not seem to be in great demand. But there are few colleges that could not, with advantage, include a few popular lectures on applications of light in their year's work.

We are also asked for **books**—not general books on illumination, of which several excellent examples are available, but specialised treatises. This demand for specialisation is significant. We have been asked to mention books on electric discharge lamps, factory lighting, and street lighting—one reader even asks for the latest book on street lighting with sodium lamps!

One obvious difficulty, especially in connection with fields of lighting into which electric discharge lamps enter, is that books tend to become out of date before they are completed. Indeed this applies in a measure to all aspects of lighting. It does seem that what we need at the moment is, not volumes, but concise hints and recommendations, such as can be rapidly prepared and issued in pamphlet form.

Mr. A. K. Taylor asks why it is still so usual for **lamps** to be **burned cap-downwards** in table and desk lamp fittings. The distribution of light suffers and the life of some lamps, i.e., gas-filled and "coiled coil" types, may be shortened if the lamp is thus used. We should like to hear the views of experts on this point. No doubt the design of a table-lamp is rather simpler when the lamp projects out of the upright. It would appear that in any case there must be some obstruction of light if the lamp is immediately over the

pillar—though this is much reduced when a diffusing shade is introduced below the lamp, as in the case of the now familiar "standard" table lamp for students.

Mr. Waldo Maitland, who, we believe, was responsible for advising Mr. Wornum in regard to the lighting of **Gas Industries House** (Grosvenor-place), points out an oversight in the recent illustrated article describing this building. The lighting fittings in the board room and committee rooms are, in fact, electric, being similar in design to those used in the R.I.B.A. building.

Our attention has again been drawn to the **lighting of cinema theatres**, a matter which we recently mentioned in these columns. In reply to inquiries we repeat that there seems no valid technical reason why films should be shown in almost complete darkness. Quite a reasonable amount of diffused lighting could doubtless be provided, if skilfully arranged, without in any way spoiling the picture. We have heard it suggested that the public would resent an increase in lighting and the distraction caused by movements of others in their seats being visible. We can only say that in the case of other entertainments—football matches for example—quite evident and comparatively violent motions of people in adjacent seats during moments of excitement do not occasion remark!

Amongst many appreciative comments we have heard on Mr. Murray's recent paper before the Illuminating Engineering Society on **Factory Lighting and Accident Prevention**, we should like to single out for special mention a letter from Mr. A. P. Turnbull, of the Department of Railways, N.S.W. He mentions that quite a number of Mr. Murray's recommendations have been in force in the workshops of that department for the past thirty-five years. We hope to return to this matter in a later issue.

Reviews of Books

Heating and Air Conditioning of Buildings. By Oscar Faber and J. R. Kell. (The Architectural Press, London, 1936; pp. 434. 25s. net.)

Whilst our readers are mainly interested in lighting problems, it must not be forgotten that lighting, heating, and ventilation are often closely associated, and really need joint treatment in buildings of modern type. This book, therefore, well deserves a place on the shelf of the illuminating engineer. There are nineteen chapters, covering a very wide range of topics. Various systems of heating are discussed. Boilers, oil firing, warming by hot water and hot-water supply, air conditioning and refrigeration are some of the subjects treated. Special chapters are allotted to the parts played by gas and electricity in connection with heating and hot-water supply, and there is a final chapter on combined electrical generating stations, in which generation of electricity and the use of the waste heat from the point are treated as joint operations. There are many useful illustrations and an adequate index.

Literature on Lighting

(Abstracts of Recent Articles on Illumination
and Photometry in the Technical Press)

(Continued from Page 107, April, 1937)

I.—RADIATION AND GENERAL PHYSICS.

111. The Amount of Luminous and of Ultra-Violet Solar Radiation Received on Certain Vertical Planes.

Kunerth, Miller, and Hurley. *Am. Illum. Eng. Soc. Trans.*, No. 3, pp. 315-328, March, 1937.

Data previously obtained on the amount of solar radiation falling upon a horizontal surface has been used to find the effect upon a vertical plane facing north, south, east, or west. The daily and annual cyclic variation is fully described, and the effect of cloudiness is incorporated in the results. J. S. S.

II.—PHOTOMETRY.

112. On the Precision of Photometric Observations.

Alfred H. Holway. *Jour. Opt. Soc. Amer.*, Vol. 27, pp. 120-123, March, 1937.

A relation is given between discriminatory precision and fineness of discrimination for the human eye. F. J. C. B.

113. Photometric Discrimination with a Diffuse Boundary.

W. E. Knowles Middleton. *Jour. Opt. Soc. Amer.*, Vol. 27, pp. 112-116, March, 1937.

The writer has determined the effect of a diffusing line of demarcation in the photometric field upon the accuracy of the photometric balance. F. J. C. B.

114. Brightness Meter Developed by Luckiesh and Taylor.

Anon. *Am. Illum. Eng. Soc. Trans.*, No. 3, p. 235, March, 1937.

Describes a photometer for measuring the brightness of objects at distances up to 500 ft., when an object one foot wide can be observed. An equality of brightness field is employed, and brightness of the comparison field is varied by a circular graded filter in front of the comparison lamp. J. S. S.

115. A New Colour Separator.

W. Richter. *Electronics*, 10, No. 3, p. 28, March, 1937.

A photoelectric colour separator is described, the feature of which is the method used in which the proportions of the two colours in each sample are measured. Care is taken that the specimen is viewed from the same angle for the two colours. S. S. B.

III.—SOURCES OF LIGHT.

116. A Quartz Mercury Arc with Electrodes of Low Work Function.

William T. Anderson, Jr., and F. Bird. *Jour. Opt. Soc. Amer.*, Vol. 27, pp. 95-99, March, 1937.

The authors claim that, watt for watt, this burner makes possible a more efficient conversion of electrical energy into light than can be obtained in the usual forms of quartz mercury arcs. F. J. C. B.

117. Characteristics of the 85 W. High Intensity Mercury Vapour Lamp.

D. S. Gustin. *Am. Illum. Eng. Soc. Trans.*, No. 3, pp. 282-288, March, 1937.

This lamp is of the high-pressure type using a quartz inner bulb about 1½ in. in length. The operating pressure is about 25 atmospheres, and the efficiency 35 L/W. As the mercury is not fully vaporised under normal conditions, a transformer must be used. Structural and operating details are given, and possible uses for the lamp are suggested. J. S. S.

118. New 100 Watt Mercury Lamp Developed.

Anon. *Am. Illum. Eng. Soc. Trans.*, No. 3, p. 237, March, 1937.

A new high-pressure mercury vapour lamp running at about two atmospheres pressure is described. The efficiency is stated as 30 L/W, and the length of the lamp is 6 in. The lamp will run directly from 110 volt supplies. J. S. S.

119. Further Characteristics of the Carbon Arc.

W. C. Kalb. *Elect. Engineering*, 56, pp. 319-324, March, 1937.

In this paper the carbon arc is considered in its three characteristic forms—the low intensity arc, the high intensity arc, and the flame arc. The influence of the arc current on the energy emission is discussed in relation to each of the three types, as well as the effects of variation in arc voltage. The discussion covers characteristics which should be given consideration in order to make the most effective application of the various types of arcs. S. S. B.

120. Silvered Bowl Lamps.

Anon. *Light*, VI., No. 2, pp. 16-19, February, 1937.

Details with photographs are given of a number of fittings designed for use with silvered bowl lamps. A fitting similar to that used in the study lamp is included. C. A. M.

IV.—LIGHTING EQUIPMENT.

121. Lighting Equipment.

Anon. *Elect.*, 118, pp. 422-425, March 26, 1937.

Numerous photographs with descriptions are given of new lighting fittings now on the market. C. A. M.

V.—APPLICATIONS OF LIGHT.

122. Light and Architecture.

Anon. *Trans. Am. Illum. Eng. Soc.*, No. 3, pp. 230-246, March, 1937.

Some representative architectural lighting schemes are described with photographs. J. S. S.

123. Sodium Luminaires for Highway Lighting.

George A. Eddy. *El. World*, 107, p. 1054, March 27, 1937.

The author gives a simplified description of the American 10,000 lumen sodium lamp, its construction and operating characteristics, and its application in street lighting fittings. S. S. B.

124. Country Road Lighting.

J. G. Park. *El. Rev.*, Vol. CXX., No. 3098, p. 534, April 9, 1937.

Suggests a modification for increasing the amount of light thrown on the road by simple inverted cone reflector fittings, and suggests a method of lantern suspension from telephone wires, when poles are not available. R. G. H.

125. Night Accident Areas.

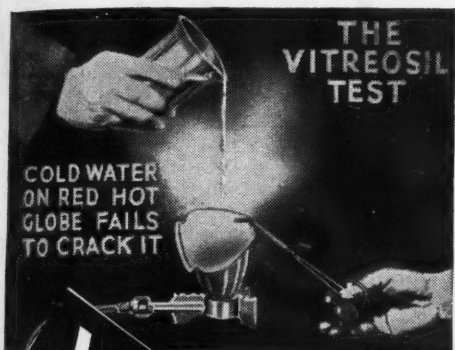
Anon. *Light*, VI., No. 2, pp. 14-15, February, 1937.

Photographs with particulars of fittings, light sources, road surfaces, etc., are given for two street lighting installations in America. C. A. M.

126. Improved Lighting in Passenger Vehicles.

Anon. *Elect. Engineering*, 56, pp. 302-304, March, 1937.

The article is a report of an address to the A.I.E.E., outlining modern methods of lighting used in road and



ONLY VITREOSIL LIGHTING WARE GIVES THIS MARGIN OF SAFETY

Note the Vitreosil Test. Only Vitreosil Lighting Ware survives this ordeal. Any other lighting glassware, even though it passes the British Standard Specification Test, would be shattered by the shock of sudden cooling from red heat. This means a margin of safety far in excess of the needs of domestic or industrial lighting. It enables Vitreosil Globes, Bowls and Reflectors to be used on high-pressure and super-heated burners without the slightest fear of "flying."

Moreover, smaller shapes can be confidently used, thus concentrating the mantle heat and producing a brighter light which is softly diffused with the minimum loss by passage through Vitreosil.

There is unique beauty in the pearly lustre and satin-like surface of Vitreosil, and the patterns are designed for modern decorative needs.

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transport vehicles. Several types, with illustrations, are considered. S. S. B.

127. Report on Lighting in the Shoe Manufacturing Industry.

Committee on Industrial Lighting of the Illuminating Engineering Society. Am. Illum. Eng. Soc. Trans., No. 3, pp. 289-314, March, 1937.

The processes involved in shoe manufacture are treated in detail, and lighting schemes are suggested for each particular process. The production of leather and rubber shoes are discussed separately. J. S. S.

128. Report on Lighting in the Textile Industry.

Committee on Industrial Lighting of the Illuminating Engineering Society. Am. Illum. Eng. Soc. Trans., No. 3, pp. 247-281, March, 1937.

Discusses problems of visibility in various processes of the textile industry, and gives recommended levels of illumination. The effect of lighting upon the economics of production is treated in detail for the weaving of grey goods. J. S. S.

129. Better Light on the Type.

Frank D. Chase. El. World, 107, p. 918, March 13, 1937.

In a short article the system of "skylight" units used for lighting the printing rooms of an American journal is described. Large diffusing surfaces are employed to avoid bright reflections from the type face. S. S. B.

130. Hosiery Mills.

Anon. Light, VI, No. 2, p. 13, February, 1937.

A brief description is given, with a photograph, of the lighting equipment of the inspection department of a hosiery factory in America. Glassteel units each using a 500 w. tungsten lamp and a 250 w. mercury lamp, one employed illumination values of 65 foot candles have been obtained. C. A. M.

131. Royal American Shows.

Anon. Light, VI, No. 2, pp. 28-29, February, 1937.

The lighting of travelling shows in America is provided by portable Diesel plant. Each unit is housed in a wagon which carries an aluminium lighting tower, easily erected or dismantled, on which floodlighting equipment is mounted. Photographs are given. C. A. M.

132. Floodlighting.

"E. O. T." Elect., 118, p. 461, April 2, 1937, Elect., 118, p. 487, April 9, 1937.

The former article deals with general considerations of the performance of floodlights. The latter article gives calculations for an installation. C. A. M.

133. Coronation Floodlighting.

Anon. El. Times, 91, p. 449, April 1, 1937.

A set of photographs of various floodlighting installations which were used for the 1935 Jubilee celebrations, and which will be repeated for the Coronation. W. R. S.

134. Inexpensive Coronation Illuminations.

Anon. El. Times, 91, p. 351, March 11, 1937.

An account, with photographs, of some of the cheaper types of decorations available for the Coronation celebrations. W. R. S.

135. Artificial Light in Horticulture.

Anon. Lux, 10, No. 4, March, 1937, pp. 40-44, March, 1937.

Describes, with illustrations, the process of applying artificial light to stimulate plant growth and gives advice in regard to arrangement of lights, quality of light, period of exposure, etc. A form of pedestal lamp, with a circular basket midway up the standard to contain plants, which receive illumination from above, is shown. Another photograph confirms the belief that trees in the vicinity of public lamps retain their leaves longer than others. J. S. D.



Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 461,111. "Improvements in or Relating to Electric Discharge Tubes having a Cadmium Vapour Filling."

N. V. Philips' Gloeilampenfabrieken. Dated August 6, 1935. (Convention, Germany.)

According to this specification, the envelope of a cadmium-vapour discharge tube is made of a silicate glass free from boric acid and alkali. The glass may contain 55 per cent. to 78 per cent. SiO_2 , 12 per cent. to 23 per cent. Al_2O_3 , and 10 per cent. to 30 per cent. CaO .

No. 461,242. "Improvements in or Relating to Electric Arc-Lamps."

Baird, J. L., and Baird Television, Ltd. Dated July 9, 1935.

This specification covers an arc-lamp for cinematography television, optical projection, or the like, in which the electrodes are housed in a chamber through which a steady stream of gas or air is passed, the pressure within the chamber being maintained high, for example, at 5 to 10 atmospheres. The electrodes may be surrounded by water jackets.

No. 461,661. "Improvements in or Relating to Electric Head-Lamp Lighting Arrangements for Vehicles."

R. Bosch Aktiengesellschaft. Dated November 29, 1934. (Convention, Germany.)

This specification covers an electric vehicle head-lamp lighting arrangement, in which an accumulator is charged by an alternating current generator through a dry rectifier and two light sources are capable of being switched on simultaneously for illuminating the roadway, one of the light sources being directly connected to the generator, and the other being independently connected to the accumulator. The two light sources may be the two filaments of a double-filament lamp, both of which may be disposed in close proximity to the focus of the head-lamp.

No. 461,977. "Improvements in Surgical Lamps."

Parfitt, A. W. (Communicated by Aperay Laboratories Inc.) Dated August 26, 1935.

According to this specification a surgical-light projector comprises a casing with a translucent cover-plate and a tubular housing disposed around light source, connected at one end to the casing and having its other end disposed adjacent to the cover-plate. The housing is translucent, at least in the vicinity of the light source, and there are ventilating openings in the cover-plate and in the casing communicating with the interior of the housing to produce a draught there-through away from the direction of light projection, so as to prevent the internal parts becoming over-heated. The translucent part of the housing may form a screen for intersecting infra-red and heat rays.

No. 462,022. "Improvements Relating to Advertising and Light Signs Comprising Luminous High-Frequency Electric-Discharge Tubes."

Foder, J., and Pisagua Holdings, Ltd. Dated August 22, 1935. (Cognate Applications.)

This specification describes a sign comprising a supporting base having a plurality of sockets equally spaced therein, and supplied with high-frequency current, and luminous-discharge tubes having the

form of characters, the ends of which are so dimensioned and positioned that they may be mounted in the sockets to feed the tubes with high-frequency current. The tubes are thus interchangeable. The high-frequency generator may be enclosed within the base, which may be of sheet-metal with an insulating panel to carry the sockets, and may thus form an electric screen to minimise radio interference.

No. 462,056. "Improvements in Apparatus for Directional Illumination."

General Electric Company, Ltd., and Beggs, S. S. Dated September 19, 1935. (Addition to No. 360,664.)

This specification describes a lighting fitting for furnishing from a linear source directional illumination in preferred planes comprising reflectors above the source, and constituting the main light directing elements, and one or more glass strips carrying on their inner or outer faces refracting prisms with their edges parallel to the source and intersecting light emitted by the source in direction passing just below the edges of the reflectors.

No. 462,312. "Improvements in or Relating to Shades or Reflectors for Electric Lamps or Other Light Sources."

Troughton and Young, Ltd., and Read, A. B. Dated September 5, 1935.

This specification relates to shades or reflectors of the kind formed of an opaque or translucent material adapted to restrict direct vision of the light source, having an aperture or apertures formed in its external surface and provided on the inner side of the shade or reflector with a light-trap visible through the aperture and arranged to prevent direct egress of light from the source, and to be illuminated on its surface, visible through the aperture, by light reflected from the interior of the shade or reflector, or from the light source, so as to give the effect of a bright patch on the external surface of its shade or reflector. According to the specification, the light-trap includes an inwardly directed lip formed on the shade around a part of the aperture and arranged to restrict vision through the aperture into the interior of the shade. The lip may extend substantially parallel to the inner surface of the shade and over the aperture. The invention described is applied to a concave shade for indirect lighting.

No. 462,356. "Improvements in and Relating to Electric Discharge Lamps."

British Thomson-Houston Company, Ltd. Dated August 30, 1934. (Convention, U.S.A.)

This specification relates to low-pressure positive column or cathodic glow lamps containing a vaporisable substance, such as sodium, and operating with a small vapour pressure. According to this specification, such a lamp has spaced electron emissive electrodes, and electrode heating and ballast resistances are located in the discharge space of the lamp, and are connected in a series circuit across the supply terminals of the lamp, the electrodes being connected to be subject to the voltage drop across the electrode heating resistances. The ballast resistances are symmetrically located in the discharge space so that the wall of the space is heated to a substantially uniform temperature to maintain an adequate vapour pressure.

The largest and most important Industrial Installation of Electric Discharge Lighting in this Country

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2,000
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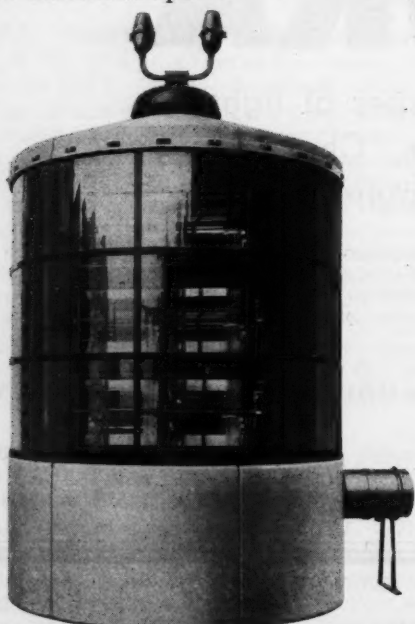
Singapore Air Base Lighting Equipment

A new type of G.E.C. 6 kw. six-lamp aerodrome landing floodlight has been developed by the General Electric Company, Ltd., for the new Singapore Air Base.

This new floodlight, which employs similar optical principles to the standard types of G.E.C. aerodrome floodlights, incorporates a new type of cylindrical housing, constructed of specially moulded asbestos-like material ("Urastone"). The complete floodlight is approximately 9 ft. high by 7 ft. diameter inside, providing ample room for an operator to change lamps, make adjustments, or carry out necessary cleaning operations efficiently during adverse weather. A special fan is incorporated owing to the climatic conditions which often prevail at this base.

Six of these units have been supplied for Singapore, five being glazed through 180° and one through 360°; the reason for the latter, it is understood, is that this type of unit is to be positioned on the boundary between the aerodrome and the seaplane base, where it can be used either for illuminating the aerodrome, or, alternatively, the floodlight inside the housing can be rotated through 180°, and used to illuminate certain approaches to the seaplane base.

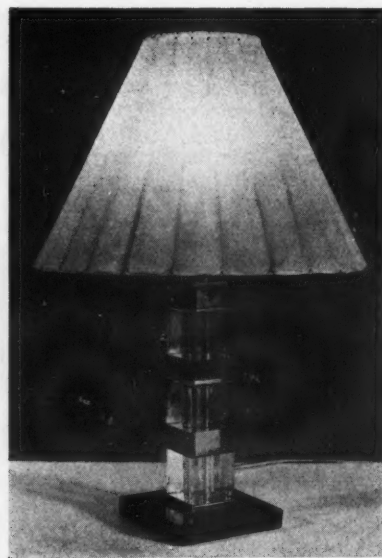
The units are fitted with the usual dual obstruction lights. The illustration shows an exterior view of this lighting unit, which is equipped with six Osram 1,000-watt horizon lamps.



G.E.C. 6 kW. 6-lamp Aerodrome Landing Floodlight for Singapore Air Base.

New Lampshade Materials

In the course of a recent visit to the showrooms of 20th Century Electrical in Newman-street, London, we were impressed both by the variety of design of modern decorative lighting fittings and by the range of material now available. There has been much speculation about the future of synthetic materials. Can they be adapted to the manufacture of large moulded hemispheres, etc., and to serve generally as a lighter and less fragile substitute for glass? How far it is possible to provide such a substitute which can withstand long continued use without deformation or loss of translucency remains to be seen. But



Crystal Cube Table Lamp, with pleasing "Sunray" shade in Pastel Cellulose material and black glass base (20th Century Electrical).

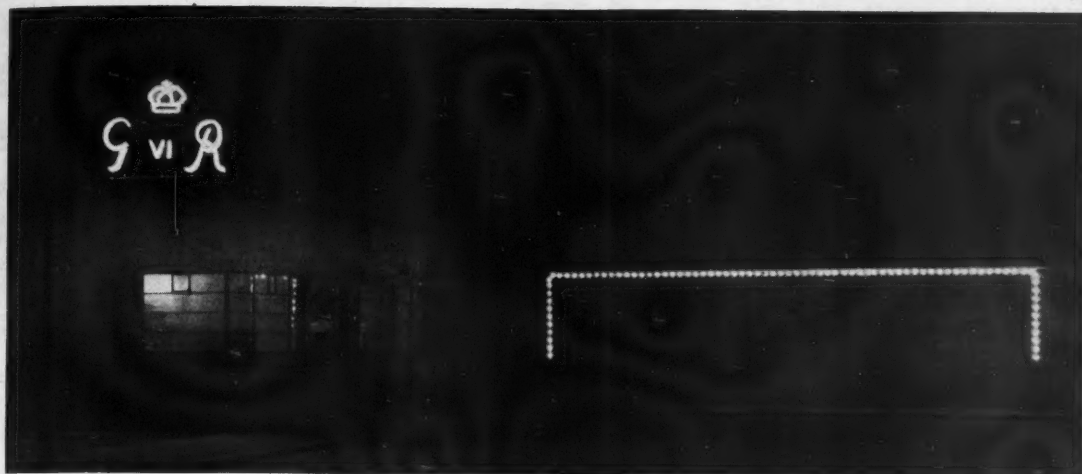
in certain fields, notably lampshades of decorative design, such materials have proved their value and permit a remarkable variety of textures and tints.

The materials mentioned in a recently issued 20th Century Electrical list include some of this type, and are divided into four main groups—cellulose materials, opal vegetable parchment, "Sumatra" woven fabric, parchment and buckram materials of various kinds. These groups are again divided according to finish and colour. We illustrate one pleasing design. The leaflet before us pictures many others, both table lamps and floor standards of agreeable design.

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A New Type of Ornamental Gas Lighting



Courtesy : The Gas Journal

Those whose memories carry them back to the Jubilees and Coronations in the past will recall the effect of the twinkling gas jets, for which the quality of gas then manufactured was well suited, and which were widely used for the outlining of buildings, etc. At the present time there is a need for something similar, but brighter, in the field of gas lighting, and it appears that a device recently introduced by the South Metropolitan Gas Company will meet the need. It involves a combination of a high-pressure burner with a special form of gas mantle. Gas is supplied at 30-in. W.G. to a number of nozzles, on each of which is mounted one of the special gas mantles, consuming only one cubic foot per hour. The mantles are supplied in an unburned state, and when lighted they shrink rapidly, so as to become a small hemispherical source of light of great brilliancy. The mantles require no protection from the weather, their average life is over 100 hours, and their cost is low. The design here illustrated uses 240 such mantles, giving an aggregate of more than 10,000 candles. We learn from the *Gas Journal*, to whom we are indebted for these particulars, that the device is to be used on several sites during the Coronation period.

"Louverlux" Fittings

Ex Knightsbridge semper aliquid novi—which may be interpreted "Mr. Young has always something new up his sleeve."

On May 20, visitors to the Lighting Centre were given an opportunity of examining the new "Louverlux" fittings. One of them is here illustrated, but the catalogue features a small army, all specially designed. The essential feature is the combination of reflectors of various types with a louvre attachment inserted just within the rim, which interferes little with the downward distribution of light, but makes it practically impossible to see the lamp itself when looking upwards at the fitting. By this means, it is claimed, glare is completely eliminated. The idea should be specially acceptable in those cases (the barber's shop, for example), where the illumination of the features is inevitably associated with direct light striking the eyes. It is also specially recommended for use in schools, hospitals, offices, shops, and factories. A smooth and lasting surface is made possible by the use of aluminium for all visible metal work in fittings, and, by a new process, this can be given lasting colours in great variety.

Coronation Lighting

To be fully described in next issue

In our next (June) issue we shall be dealing fully with the Coronation Lighting, which is to be described at the annual meeting of the Illuminating Engineering Society on May 19.

We invite notes on any particularly interesting effects likely to interest readers at home and abroad.



An example of a "Louverlux" fitting designed for a 75 w. lamp. The spiral louvre arrangement, below the lamp, is clearly seen.

THE CORPACT MANUFACTURING COMPANY beg to advise their numerous Clients that they are specialists in the manufacture of all types of Capacity Operated Switch Gear, and undertake the design and manufacture of Electrical Mechanical equipment requiring expert staff.

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Will not run back. No wheels to get caught in. Sizes to 10 cwt. smallest wall space, side or front driving, also special types including multi-divisions barrels, combined horizontal and vertical operation.

Bond-street Coronation Scheme

We are informed that the District Electrical Co. of Finchley are carrying out the banner floodlighting scheme for the Coronation in Bond-street, and that 150 special floodlights manufactured by the General Electric Co., Ltd., are to be used in the scheme.

I.E.S. Transactions: Spring Back Covers

Spring Binders, for holding copies of the Transactions, can be obtained by members of the Illuminating Engineering Society, at a cost of 2s. 6d. each, on application to 32, Victoria street, S.W.1.

Notes on Gas Lighting

A new three-year contract for street lighting by gas covers Bradford-on-Avon. About 160 lamps are affected.

* * *

New lighting contracts in Kent rural areas include Aylesford and Eccles, Sutton Valence, Burham and Charing. All these districts are gas lighted.

* * *

Of the thirty-eight miles of public light in Hinckley, gas is responsible for thirty-five, with a total of 660 lamps. The annual consumption totals 11,600,000 cubic feet.

* * *

Denton U.D.C. has decided to sell its gas works to the United Kingdom Gas Corporation for a sum of £82,500. An agreement has also been reached with the corporation for street lighting by gas for a period of ten years.



The Backs, Cambridge, under the improved lighting installed under the recent 10-year old contract for gas lighting.

SITUATIONS VACANT

The Curtis Lighting Company, manufacturers of X-Ray Reflectors and Lighting Equipment require energetic young men with a knowledge of illuminating engineering to train as Sales Engineers for London and Provinces.—Particulars of education and previous experience should be addressed in confidence to the Managing Director, Curtis Lighting Co. of Gt. Britain, Ltd., Aldwych House, Aldwych, London, W.C.2.

I.E.S. Silver Jubilee Award

Applications in respect of the above award, available annually to a member of the Illuminating Engineering Society of any class who is not more than twenty-six years of age, should reach the Hon. Secretary of the Illuminating Engineering Society not later than June 30, 1937.

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Although standard NIPHAN cable couplings and plugs are made in a wide range of sizes and capacities, we are often asked to design special fittings for unusual applications. If after looking through our illustrated catalogue (free on request) you do not find what you want among the existing NIPHAN fittings, we'll be glad to prepare special designs for you.

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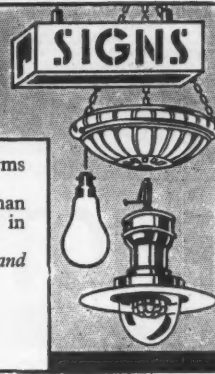
A DIRECTORY OF LIGHTING EQUIPMENT

We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3½ inches wide) are given below.

These terms are equivalent to half our ordinary advertising rates, but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

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Quick hoisting with little effort
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46 "PHOTRONIC" Photo-electric
ILLUMINATION METERS
BY
WESTON

E.L.M.A. Provincial Branch in Yorkshire Area

A provincial branch office of the E.L.M.A. Lighting Service Bureau was opened on May 1 in Leeds.

This new office (at 10, Apson Chambers, 68, Albion-street, Leeds, 1) will serve an extensive area, including such towns as Leeds, Sheffield, Bradford, Halifax, Huddersfield, Hull, and York. An active campaign has been mapped out by Mr. J. W. Howell, who, after serving four years as the industrial specialist of the E.L.M.A. Lighting Service Bureau in London, has been appointed to take charge of the new office.

Mr. Howell, who is a Northern man, received his training at the Loughborough College of Engineering. He subsequently joined the Birmingham staff of the General Electric Company in 1923, and became associated with the E.L.M.A. London Bureau in 1933.

Mr. Howell has also taken an active part in the work of the Illuminating Engineering Society, having recently read an informative paper on the lighting of mines, besides acting as honorary secretary of the newly formed industrial lighting section. All members will join us in wishing him luck in his new sphere.

Electric Street Lighting

Billingham-on-Tees.—A new lighting scheme, inspected by the Council on April 1, involves about twelve miles of main roads lighted by 400-watt mercury electric discharge lamps and fifteen miles lighted by filament lamps. Night lights at important points have been more than doubled. Time switch control is used throughout.

Deptford.—A two-and-a-half-year scheme involves an annual expenditure of £15,615, of which about £13,000 is for energy and maintenance. Mercury discharge lamps are used. Roads are being classified in terms of wattages (400, 250, 125, and 80) of lamps used. The improvement covers about fifty miles.

Lambeth.—A new installation involving some thirty-five miles of electric discharge lamp lighting was opened on April 7. A feature is the use of electric discharge lamps in secondary thoroughfares.

Newcastle-on-Tyne.—Special decorative lanterns, 132 in number, each 4 ft. high and 28 in. wide, are being erected in the chief streets during the Coronation period.

Peterborough.—A scheme involving the introduction of 351 new lamps, chiefly of the sodium discharge type, is to be met by a loan of £8,054.

Reading.—Good progress is being made with the £36,000 three-year plan for lighting, 400- and 250-watt mercury discharge lamps are being used on main roads, and 200-watt filament lamps on secondary roads. Special arrangements are being made to grade the lighting so as to avoid sudden contrasts in passing from main roads to secondary roads or vice versa.

Scarborough.—Queen's-parade, Blenheim-terrace, and Hunters'-row are to be lighted by electricity in the near future. 500-watt filament lamps, mounted 25 ft. high, are preferred. The Corporation's adviser on town development is co-operating with the electricity department in the design of standards.

Hammersmith.—Westway (which formed the subject of a recent speed limit controversy) is to have electric discharge lamps mounted 125 ft. apart and 25 ft. high. The cost will be £1,024.

Halifax.—The committee has approved a scheme for permanent improvements in street lighting for the Coronation in preference to temporary floodlighting.

Birmingham.—The scheme for relighting the chief traffic routes is proceeding rapidly, about 150 units being completed each week. Mercury electric discharge lamps are being used wherever a.c. is available, and in other places filament lamps, as a temporary expedient.

Crewe.—An additional £600 is to be spent on street lighting improvements, which include sodium lighting in Gresty-road and South-street.

Contracts Closed

Messrs. Siemens Electric Lamps and Supplies, Ltd. inform us that, following the successful "Sieray" street lighting installation in the Euston-road, St. Pancras Borough Council has placed a further order for 110 similar Sieray units, to complete lighting of Euston-road and to effect further improvements in the lighting of the Borough.

In addition, the Post Office has placed a contract for twelve months supply of Siemens' electric lamps.

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1872

The Complete Technical Journal

Gives practical information and authentic technical commercial news necessary to those who are concerned with the Production, Installation and Maintenance of electrical equipment, Generation and Distribution. Its advertisement pages constitute the most complete Buyers' Guide to all electrical products.

All those interested in illumination matters will find this journal of particular value in its description of fittings and material used in up-to-date installations, giving detailed descriptions of the equipment of important new buildings.

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"LUX" (La Revue de l'Eclairage)

WE have pleasure in announcing to our readers that we have entered into an arrangement to receive subscriptions for the French journal "Lux" (La Revue de l'Eclairage). The subscription per annum is 30 francs, the approximate equivalent of which in English money is Seven Shillings and Sixpence (7/6).

"Lux" is the only French journal which specialises in all aspects of Lighting; it is the official organ of the Association Française des Ingenieurs de l'Eclairage (equivalent to the Illuminating Engineering Society in France).

It furnishes a complete record of interesting developments in lighting in France and on the Continent. It is fully illustrated and in particular devotes a considerable number of its pages to Decorative Lighting.

By studying these articles and the numerous photographic reproductions of modern lighting installations the reader can readily gain an excellent impression of French methods and practice in matters of Illumination.

Applications for subscriptions will be received by "Light and Lighting", 32, Victoria Street, London, S.W.1.

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INCREASE IN GAS STREET LIGHTING

The following figures are quoted from the 1935 edition of "Field's Analysis." This authoritative annual publication analyses the working results of the more important company-owned and municipally-owned gas undertakings in the British Isles.

STREET LIGHTING

(Number of Public Lamps)

	1934	1935
COMPANY UNDERTAKINGS - - -	193,481	196,766
LOCAL AUTHORITY UNDERTAKINGS - -	205,766	208,381

SALE OF GAS FOR PUBLIC LIGHTING

(Therms 1,000's)

	1934	1935
COMPANY UNDERTAKINGS - - - -	16,567	17,272
LOCAL AUTHORITY UNDERTAKINGS - -	17,818	18,423

Among the cities covered by this statistical review are London, Liverpool, Dublin, Newcastle-upon-Tyne and Sheffield (served by company undertakings); while the municipally-owned undertakings analysed include those at Birmingham, Leicester, Leeds, Edinburgh, Belfast, Manchester, Glasgow and Nottingham.

It is interesting to observe then that among gas undertakings, whether company or municipally directed, the sales of gas for public lighting are going up and the number of gas lamps in use is increasing.

Issued by the

BRITISH COMMERCIAL GAS ASSOCIATION

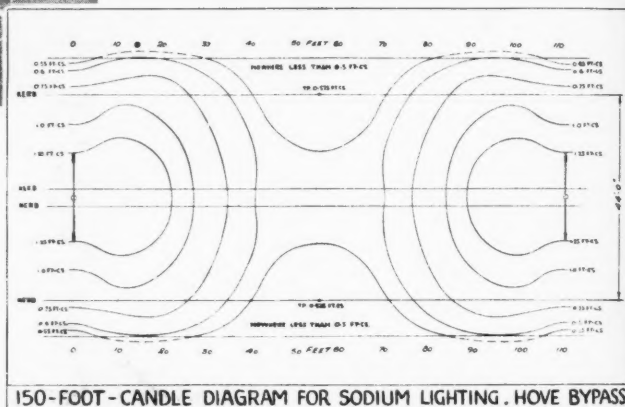
Gas Industry House, 1, Grosvenor Place, London, S.W.1.

SODIUM



STREET LIGHTING AT HOVE

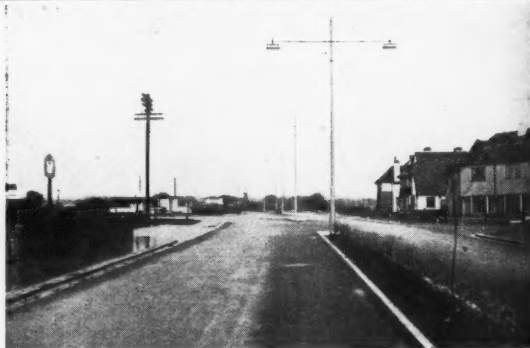
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AT THE
TEST POINT
NOWHERE LESS THAN
0.5 F.C.S.



The illustrations show the day and night views of the new HOVE BY-PASS, where an extensive system of Sodium street lighting has just been completed.

The use of HOLOPHANE PRISMATIC REFRACTOR PANELS ensured a uniform light distribution with a test point reading of 0.525 F.C.S.

The installation was carried out by THE BRIGHTON LIGHTING & ELECTRICAL ENGINEERING CO., LTD., with HOLOPHANE Refractor Panels, No. 780, in BLEECO Lanterns specially designed to suit the requirements of Mr. T. R. Humble, Borough Engineer and Surveyor of Hove.



HOLOPHANE REFRACTOR PANELS for Sodium lighting afford the greatest measure of positive control by the power of prismatic refraction.

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IN MODERN HIGHWAY LIGHTING
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